WHAT IS CLAIMED IS:

CLAIMS

1. A punch device for a substrate having a large breadth and small thickness, the punch device comprising:

a mechanism for winding and unwinding;

a correcting control unit;

a tension control unit;

a hydraulic mechanism;

a punch mechanism;

a high frequency and high voltage generator;

a detecting unit;

a controlling means for speed;

a pulse frequency and pulse width control; and

a user interface, characterized in that the punching mechanism is composed of at least two or more electrode matrixes, each electrode matrix is made up of a plurality of electrode bars longitudinally arrayed which forms an angle α with the movement direction of the substrate

wherein each pair of the electrode bars is composed of an anode bar and a cathode bar on either side of the substrate, each bar being provided with electrode-pins in the number of M.

2. The punch device of claim 1 wherein the movement direction of the substrate crossing the electrode matrixes is vertically downward or upward and the axial direction of the positive and negative electrode-pins is horizontal.

3. The punch device of claim 1, wherein the detecting unit includes a rolling diameter detecting means, a tension detecting means, and an air permeability detecting means for the substrate.

4. The punch device of claim 1 wherein the high frequency and high voltage generator generates high power and high frequency voltage with an IGBT tube and a high frequency and high power booster.

5. The punch device of claim 1 wherein the controlling means for speed, pulse frequency and pulse width control includes a single interface for the detecting unit, a computing central processor, an output interface for signals of speed, an electrical pulse frequency and impulse width, and a corresponding computer software.

6. The punch device of claim 1 wherein the angle α between the electrode bars and the movement direction of the substrate may be changed by adjusting the position of either end of the electrode bars.

7. The punch device of claim 1 wherein the electrode matrix consists of N ($1 \leq N \leq 100$) sets of electrode bars and each electrode bar is provided with M($1 \leq M \leq 50$) electrode-pins.